

# LIST OF FIGURES

Figure 1.	Conceptual Relationships among the Terms Harm, Significant Harm, and Serious Harm .....	5
Figure 2.	Major Drainage Basins, Rivers, and Canals in the St. Lucie Watershed .....	9
Figure 3.	Variation from Annual Average Rainfall .....	10
Figure 4.	Historical Surface Water Drainage System in the St. Lucie Watershed .....	11
Figure 5.	St. Lucie Agricultural Area Drainage Basins .....	13
Figure 6.	Eastern St. Lucie Area Drainage Basins.....	14
Figure 7.	Greater St. Lucie Canal Area Drainage Basins .....	16
Figure 8.	The Interim WSE Schedule for Lake Okeechobee.....	18
Figure 9.	Lake Okeechobee Supply-Side Management.....	19
Figure 10.	St. Lucie Estuary Hydrography .....	20
Figure 11.	St. Lucie Watershed Wetlands and Natural Areas .....	29
Figure 12.	St. Lucie Estuary/Indian River Lagoon Conceptual Model .....	32
Figure 13.	Model Interactions.....	72
Figure 14.	NSM and 1995 Base Case Flows to the St. Lucie Estuary for the 31-Year Period from 1965-1995.....	76
Figure 15.	Frequency Distribution of Flows to the St. Lucie Estuary for NSM and 1995 Base Case Model Simulations .....	77
Figure 16.	NSM and 1995 Base Case Flows to the South Fork of the St. Lucie Estuary for the 31-Year Period from 1965-1995.....	78
Figure 17.	Frequency Distribution of Flows to the South Fork of the St. Lucie Estuary for NSM and 1995 Base Case Model Simulations.....	78
Figure 18.	NSM and 1995 Base Case Flows to the North Fork of the St. Lucie Estuary .....	79
Figure 19.	Frequency Distribution of Flows to the North Fork of the St. Lucie Estuary .....	79
Figure 20.	Selected Low Flow Period for 1995 Base Case NSM Conditions .....	81
Figure 21.	Results of the GIS Analysis of the North Fork of the St. Lucie River, Showing Major Features of the River and Mileage Downstream from the Gordy Road Structure .....	86
Figure 22.	Total Volume of Oligohaline Zone Habitat in the North Fork of the St. Lucie River as a Function of Distance Downstream from Gordy Road.....	87
Figure 23.	Location of the 5 ppt Isohaline Zone as a Function of Discharge from the Gordy Road Structure Based on the 1995 Base Case.....	88

Figure A-1. Indian River Lagoon/St. Lucie Estuary Conceptual Model Boundary.....	A-2
Figure A-2. St. Lucie Estuary/Indian River Lagoon Conceptual Model .....	14
Figure C-1. Primary Drainage Basin in the St. Lucie Estuary Watershed.....	C-1
Figure C-2. Thiessen Map of the St. Lucie Estuary Watershed.....	C-5
Figure C-3. Observed and Simulated Monthly Flow at S-97 without Irrigation Scheme for 1965 to 1980 .....	C-21
Figure C-4. Observed and Simulated Monthly Flow at S-97 without Irrigation Scheme for 1981 to 1995 .....	C-22
Figure C-5. Observed and Simulated Monthly Flow at S-97 with Irrigation Scheme for 1965 to 1980 .....	C-23
Figure C-6. Observed and Simulated Monthly Flow at S-97 with Irrigation Scheme for 1981 to 1995 .....	C-23
Figure C-7. Comparison of Observed and Simulated Daily Stage at S-49 for 1966 to 1969	C-24
Figure C-8. Comparison of Observed and Simulated Daily Stage at S-49 for 1981 to 1985	C-25
Figure C-9. Comparison of Observed and Simulated Stage at S-49 for 1992 to 1995.	C-25
Figure C-10. Comparison of Observed and Simulated Monthly Flow Frequency Curves at S-97 .....	C-26
Figure C-11. Comparison of Observed and Simulated Average Monthly Flows from the C-23 Basin .....	C-27
Figure C-12. Observed and Simulated Monthly Flow with Irrigation Scheme from 1965 to 1980 .....	C-28
Figure C-13. Observed and Simulated Monthly Flow with Irrigation Scheme from 1981 to 1995 .....	C-28
Figure C-14. Comparison of Observed and Simulated Averaged Monthly Flows from C-24 Basin .....	C-29
Figure C-15. Comparison of Observed and Simulated Monthly Frequency Curves at S-49 .	C-29
Figure C-16. Comparison of Observed and Simulated Daily Flow at S-49 from 1966 to 1969 .....	C-30
Figure C-17. Comparison of Observed and Simulated Daily Flow at S-49 from 1981 to 1985 .....	C-30
Figure C-18. Comparison of Observed and Simulated Daily Flow at S-49 from 1992 to 1995 .....	C-31
Figure D-1. Model Boundary Map.....	D-4
Figure D-2. Landscape Map.....	D-5

Figure D-3. Land Surface Elevation Map .....	D-6
Figure D-4. Aquifer Transmissivity Map.....	D-7
Figure D-5. Model Grid and River Location Map .....	D-7
Figure D-6. Average Annual Rainfall Map.....	D-8
Figure D-7. Average Annual Rainfall Map.....	D-9
Figure D-8. Surface Flow Vector Map .....	D-13
Figure D-9. Mean Water Level Map.....	D-14
Figure D-10. Median Annual Hydroperiod Map .....	D-14
Figure D-11. Median Annual Hydroperiod Map .....	D-15
Figure D-12. Median Annual Hydroperiod Map .....	D-16
Figure E-2. Satellite Image of the Majority of the St. Lucie River Watershed, Overlain with the Current Canal System and Township-Range Grid .....	E-3
Figure E-3. Sample Township Plat Map of Township 38 South, Range 39 East, Surveyed by M.A. Williams in May and June of 1853 .....	E-5
Figure E-5. St. Lucie River Watershed Portion of the Vegetation Map of Southern Florida (Davis, 1943) .....	E-7
Figure E-6. United States Bureau of Topographical Engineers' Map of Southern Florida in 1853 Showing "Alpatiokee Swamp" as the Headwaters of the North and South Forks of St. Lucie River. ....	E-10
Figure E-7. Mosaic of Five Township Plats from Townships 37 to 39 South, Ranges 37 to 39 East, Showing Extensive Sawgrass Marsh, Too Dense and Wet, Hence "Impracticable" to Survey.....	E-19
Figure F-1. Sketch of salinity intrusion in tidal influenced channel at low tide .....	F-2
Figure F-2. Florida Oceanographic Society Monitoring Stations .....	F-6
Figure F-3. Two-Dimensional Simulation Grid for the North Fork and the St. Lucie Estuary .....	F-8
Figure F-4. Location of the 5-ppt Isohaline Zone for the 1995 Base Case Simulations .....	F-9
Figure F-5. Location of the 5-ppt Isohaline Zone for the NSM Simulations .....	F-10
Figure H-1. Model Domain and Locations of Tide/Salinity Data Collection Stations ..	H-1
Figure H-2. Finite Element Mesh of the St. Lucie Estuary Model .....	H-2
Figure H-3. Model Verification at the A1A Bridge Station in the Lower Estuary .....	H-3
Figure H-4. Model Verification at the Roosevelt Bridge Station in the Upper Estuary ..	H-4
Figure H-5. Model Predicted Salinity Conditions at Various Magnitudes of Freshwater from St. Lucie Inlet to the North Fork.....	H-5
Figure H-6. Model Predicted Salinity Conditions at Various Magnitudes of Freshwater Inflow .....	H-6

Figure H-7. Salinity - Flow Relationship at the US 1 (Roosevelt) Bridge in the Upper Estuary.....	H-7
Figure H-8. Salinity - Flow Relationship at the A1A Bridge at Hellgate in the Lower Estuary.....	H-7
Figure H-9. Salinity Regime Transition Process at Station SE03.....	H-8
Figure H-10. Results of Long-Term Simulation Testing at the US 1 (Roosevelt) Bridge in the Upper Estuary.....	H-9
Figure H-11. Results of Long-Term Simulation Testing at the A1A Bridge in the Lower Estuary.....	H-9
Figure H-12. Natural (NSM) versus Present (1995 Base Case) Conditions Salinity at US 1 (Roosevelt) Bridge.....	H-11
Figure H-13. Future with Project versus Present (1995 Base Case) Conditions Salinity at US 1 (Roosevelt) Bridge.....	H-11